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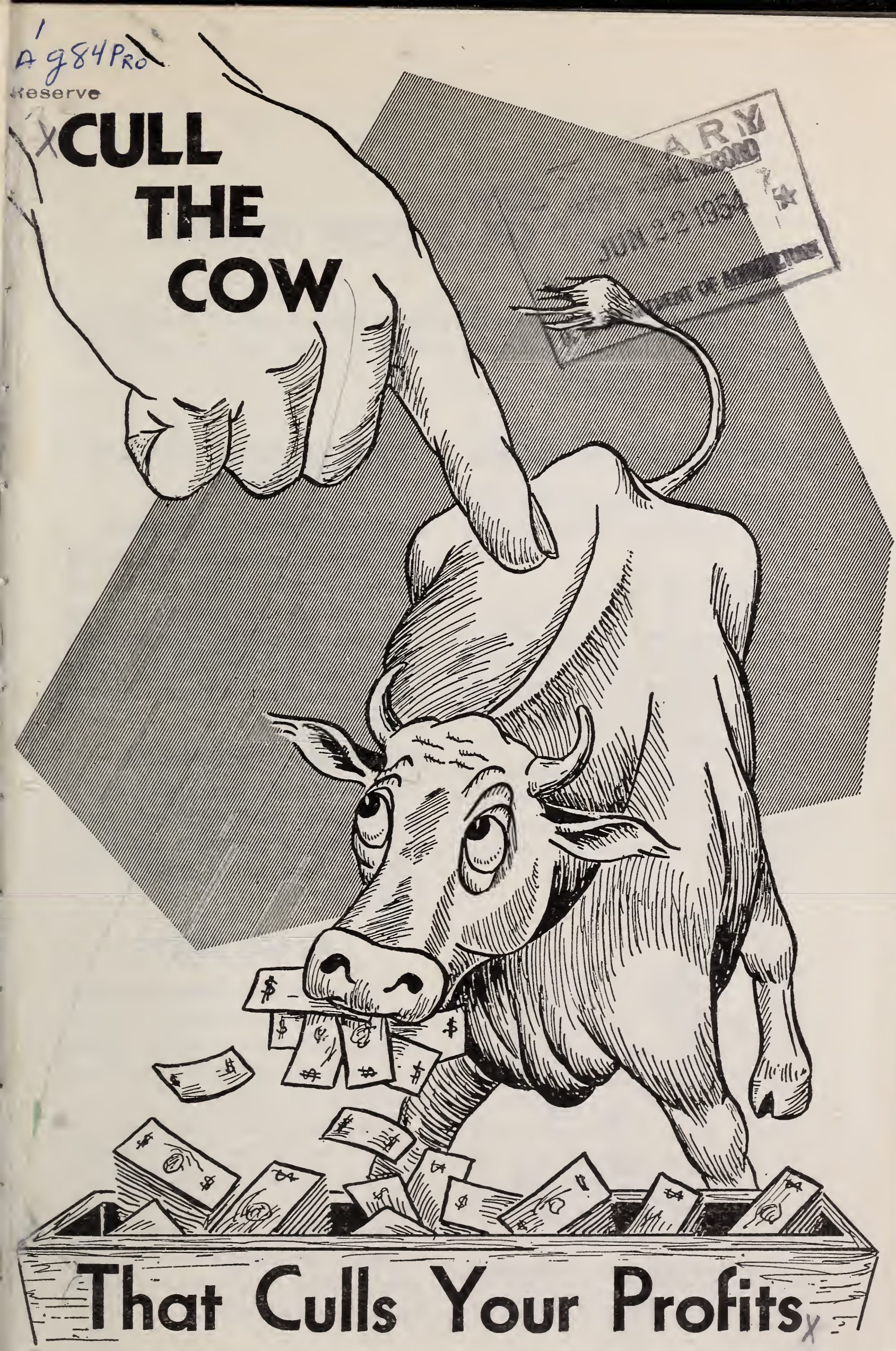
CULL THE COW



That Culls Your Profits

United States Department of Agriculture
PA-250
June 1954

CULL THE COW THAT CULLS YOUR PROFITS

Dairy farmers can help meet the present dairy situation and improve production efficiency by heavier culling of cows that are producing milk at little or no profit.

DAIRYMAN'S DILEMMA

More cows producing more milk.
More consumers taking less milk.

In the Last 10 Years:

Much progress has been made to increase production efficiency. Average production per cow has continued to increase, from 4,600 to 5,400 pounds.

BUT average consumption per person of milk in all forms has declined from 752 to 689 pounds.

CONSUMERS ARE TAKING LESS MILK PER PERSON!

DAIRYMAN'S DOUBLE DUTY

Send the Slackers to Slaughter

Culling unprofitable cows is good business anytime. By getting rid of the animal that isn't paying her way, you can use the labor and feed for more efficient producers or other farm enterprises. Closer culling is needed now.

More Milk in More Mouths

To reverse the trend of declining consumption, dairymen need to step up support of programs aimed at bringing facts about milk to the consumer.

FACING FACTS

Milk cow numbers have increased 6 percent since January 1, 1952. This increase was caused by saving more heifers and a relatively low rate of culling milk cows.

The same culling rate in 1954 as in 1953 would result in a further increase in cow numbers by 2 or 3 percent.

The culling rate needs to be increased 10 percent over the 1953 rate to hold cow numbers at the level of January 1, 1954.

A cow that makes no money for the dairyman is also a hindrance to the dairy industry. Additional production helps build up the surplus of dairy products and depress prices for the entire dairy industry.

Today's Plenty—Tomorrow's Problems

Since late 1952 production has exceeded consumption at prices consumers have been willing to pay.

In 1952 Dairy products bought by the Government to support prices were equivalent to 0.3 percent of total milk production.

In 1953 Dairy products purchased to support prices were equivalent to 8.3 percent of total milk production; however, a portion of the products had been manufactured in 1952. Government purchases as compared with production amounted to:

—One-fourth of the butter produced.

—Nearly one-third of the American cheese produced.

—About one-half of the nonfat dry milk solids produced.

In 1953 Total United States milk production, 121 billion pounds.

Total United States milk in all forms used, 116 billion pounds.

In 1954 Prospective United States milk production, 124 billion pounds. Prospective use, milk in all forms, 118 billion pounds. (This allows 2 billion pounds for the increase in population.)

People and Milk

Total United States milk consumption in all forms increased:

1920–30: At *twice* the rate of population increase.

1930–40: At the *same* rate as population increase.

1940–50: At *one-third* the rate of population increase. The decline in butter consumption per person during this decade reduced total milk requirements.

DAIRY CHANGES NEVER CEASE

In War

Government payments during the Second World War brought forth more milk. Retail price ceilings helped increase consumption of dairy products that were not rationed. On the other hand, while butter was rationed, consumption per person declined 4 pounds in 1 year from 1942 to 1943.

Farmers shifted from selling farm-separated cream to whole milk. Sales of milk as cream dropped about one-half. There was a corresponding increase in whole milk

sales. This resulted in twice as much nonfat dry milk solids for human use, the increase going to military and foreign uses.

In Peace

By the end of 1953 production of nonfat dry milk solids had doubled again since the end of the war. Consumers here at home took only about half of this production. The Government bought the other half for price support. Exports fell to a low prewar level.

Total United States milk production dropped slightly until late 1952. Then production swung upward. Government purchases of dairy products to support prices began the latter part of that year.

Per capita consumption of butter continued to decline to about 8½ pounds, one-half the prewar level. *For each 1-pound reduction in butter consumption per person about 3 billion pounds of milk was released for other uses.*

Per capita consumption of fluid milk and cream declined and then leveled off to about where it was when the war started.

The individual consumer is eating more ice cream and cheese than before the war, and twice as much nonfat dry milk solids. He has also doubled the amount of margarine he eats. The amount is now nearly the same as the amount of butter used.

INCREASED COMPETITION FROM VEGETABLE FATS

Between 1944 and early 1953, the sale of yellow margarine was legalized in 26 States leaving only 2 which prohibit its sale. The Federal excise tax of 10 cents a pound on yellow margarine was removed in 1950.

The production of frozen desserts using vegetable fat doubled between January and December 1952 in the four States that permitted their sale. Production continued to increase in those States during 1953 and frozen desserts were legalized in six additional States.

The manufacture of "filled" evaporated milk, which has vegetable fat in place of milk fat, is permitted in four States.

Of the vegetable oils used in margarine, about two-thirds is soybean oil and one-third cottonseed oil. Today, 6 hours of labor can produce 220 pounds of soybean oil from the beans grown on a single acre. This is 36 pounds per man-hour.

Allowing 3 acres of cropland and 2 acres of pasture for a dairy cow, with the average production in Dairy Herd Improvement Association herds of 366 pounds of butterfat per cow, production is at the rate of 73 pounds to the acre. With 120 hours of man-labor per cow the pro-

A TOUGH OPPONENT

duction is 3 pounds of butterfat per man-hour.

TREND TOWARD SPECIALIZATION

According to the 1950 census, milk was produced on about 3.7 million of the 5.4 million farms in the United States. Of the farms on which milk was produced, 2 million could be considered as having a commercial dairy enterprise. The other 1.7 million produced no milk for sale in 1950. Apparently most of the production on these farms was for home use. A comparison of herd size and contribution to the total milk supply is shown in table 1.

TABLE 1.—*Estimated distribution of dairy herds and percentage of milk supply produced, by size of herd, United States, 1950*

Size of herd	Number of herds	Proportion of national milk supply produced
Number of cows	*Thousands*	*Percent*
1 to 2	1, 705	9
3 to 9	1, 321	24
10 to 19	473	31
20 and more	183	35

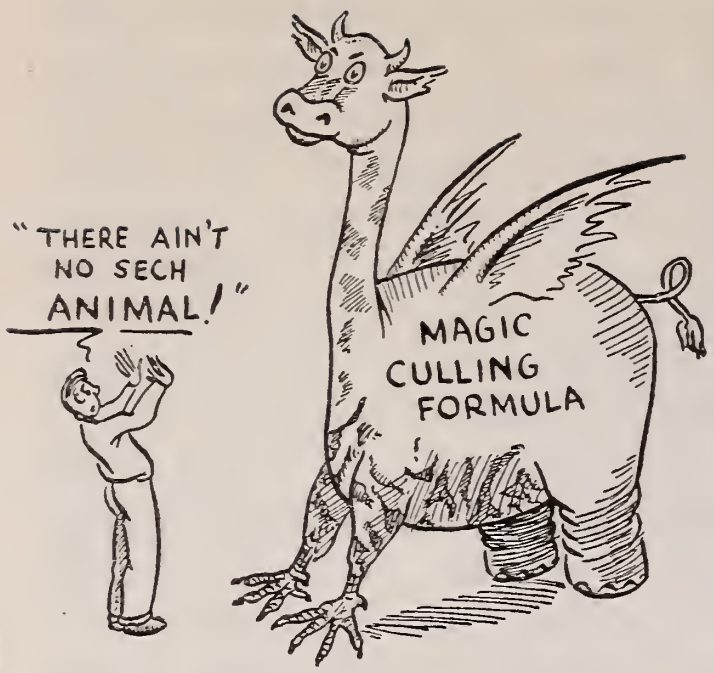
Notice that herds of more than 10 cows produced about two-thirds of the Nation's milk supply, while small herds making up one-half the total number of herds produced less than 10 percent of the milk.

In an effort to produce milk more efficiently, farmers have been increasing the size of the dairy enterprise. The result has been a trend toward larger and fewer herds. Between 1944 and 1949 (when prices of milk and butterfat averaged above 100 percent of parity) the number of farms in the United States from which dairy products were sold declined 19 percent, yet the change in the total milk production was less than 1 percent. The largest decline occurred on farms reporting less than 10 cows. For example, in Pennsylvania, 25 years ago 47 percent of the total milk production came from herds of 9 cows or less. Today, only 18 percent of the milk comes from herds of that size.

CULLING RATE DEPENDS ON CONDITIONS

To be efficient, a dairy herd must be large enough to make good use of equipment, barn space, and labor, and be made up of cows that pay their way. You would be better off without a cow that doesn't pay the direct costs of keeping her, even though you can't replace her with a better cow and the smaller herd that results would bring in less total money.

The rate of culling dairy cows depends on conditions. In 1945 when the decline in cow numbers from the alltime high began, 27 milk cows were eliminated from herds for each 100 cows on hand. In 1952, when the current buildup in cow numbers began, only 21 milk cows were eliminated for each 100 cows. Consequently, there are now on farms a substantial number of cows that ordinarily might have been culled. Many of them may be unprofitable now that the cost-price situation has changed.



NO MAGIC FORMULA FOR CULLING

There is no magic formula for culling. It is a decision facing you as an individual dairyman and pertains to individual cows in your herd. There are at least three questions to consider:

1. Will it pay you to replace cow "X" with a higher producer?
2. Will it pay you to remove cow "X" without replacing her?
3. If you decide to remove cow "X," when is the best time?

The answer to these questions involves an analysis of receipts and expenses. Your decision will also be influenced by such factors as the feed supply, labor force, barn room, and other particular circumstances of the individual farm. Aged cows, hard milkers, and slow breeders should also be considered for culling.

Milk cows should be blood tested for brucellosis. Not only are infected cows spreaders of the disease and a menace to health, but they are known to produce one-fifth less milk and are slower breeders than their healthy counterparts. Milk ordinances requiring herds to be brucellosis free are already in effect in many markets and the number of ordinances is increasing.

Replace Cow "X"?

Evidence indicates that replacement of a cow by a higher-producing cow would generally be profitable, however, in the short run it is not possible for all dairymen to do this. The total number of good cows is limited and cannot be materially increased until more are raised.

Remove Cow "X"?

Table 2 shows gross receipts per cow at various levels of production at average prices for milk on April 15, 1954, for the West North Central States, the Nation, and the New England States. By using the prices in your market, calculate your receipts at the different levels of production.

TABLE 2.—*Average gross receipts per cow from various annual production levels at different prices*

Production	Prices per 100 pounds			
	West North Central $3.19	United States $3.67	New England $4.29	Your farm
Pounds				
3,000	$96	$110	$129	$
4,000	128	147	172	
5,000	160	184	214	
6,000	191	220	257	
7,000	223	257	300	

If you sell cow "X" without replacing her, that amount of gross income represented by her production would be lost. On the other hand, some but not all, of the production expenses would be reduced or eliminated. Regional differences in costs occur as they did in the prices received for milk. Average prices of baled hay in April 1954 were $18 a ton in the West North Central States and $32 a ton in the Northeastern States. Likewise the value of 100 pounds of concentrate for milk cows ranged from $2.99 in the West North Central States to $3.97 in the Northeastern States. Assuming three different levels of costs, the reduction in expenses for each would be as shown in table 3.

This assumes that hay and homegrown grain can be sold at going prices, but that pasture and silage cannot. No reduction in labor cost is allowed, on the reasonable assumption that the labor released in handling one cow is not likely to find other productive employment, at least in the short run.

You may feed more or less grain or hay per cow than the quantities shown in the table, depending on the size of your cows, the length of the grazing season, or other factors. Your other costs may differ from those shown. The blank column in table 3 is for you to use in estimating the costs you would eliminate by culling a cow from your herd. Compare the costs with your receipts in table 2, as an aid in determining whether it would pay to remove a cow without replacing her.

Spring or Fall Culling?

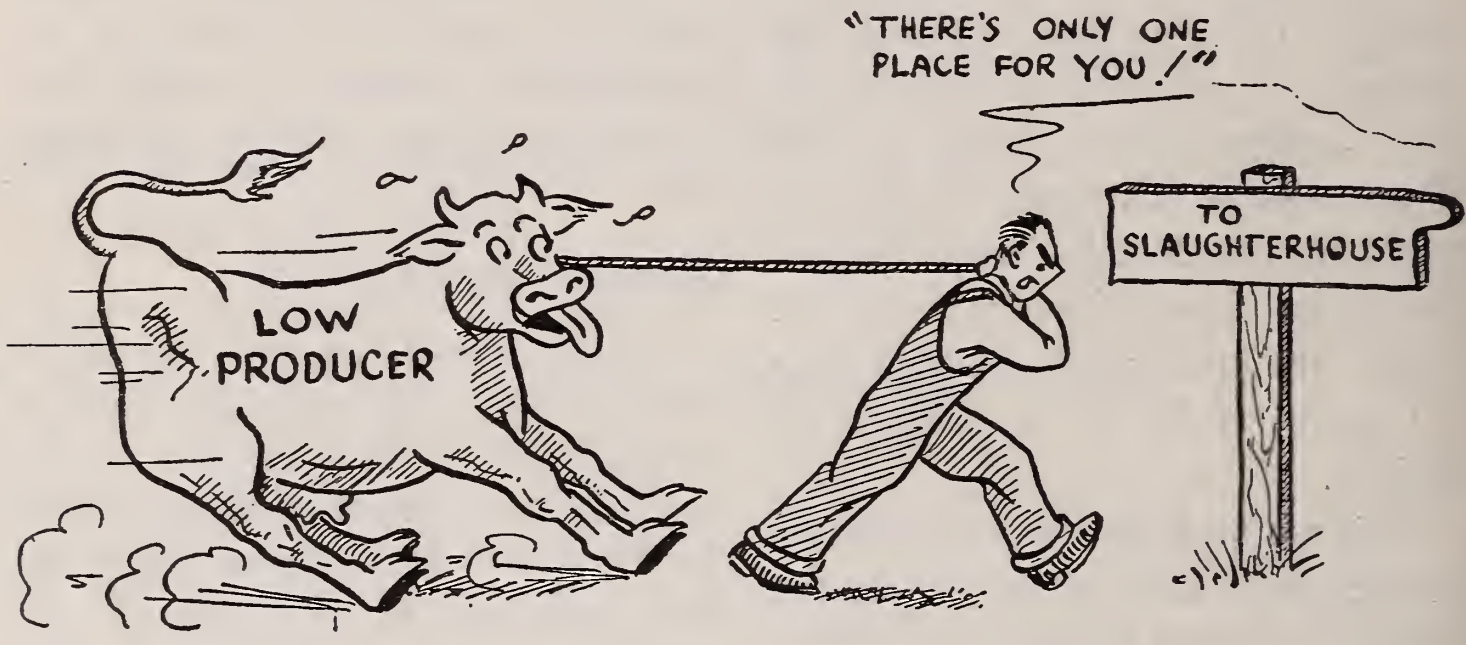
To help decide whether to cull in the spring or in the fall, make a comparison of the returns to be made from summer grazing against prospective lower selling prices for the cull cow at the end of the season. Prices are highest in the spring. Prices of utility-grade cows in a normal year are 9 percent above the yearly average in May—and 7 percent below in November.

TABLE 3.—*Estimated annual expenses eliminated by removing from the herd a cow producing 5,000 pounds of milk*

Item	Quantity	Costs			
		Low	Medium	High	Yours
Grain	0.8 ton	$48	$56	$64	$
Hay	2.5 ton	45	80	115	
Milk hauling	50 cwt	10	12	15	
Depreciation on cow		12	15	18	
Dairy supplies and services		15	15	15	
Miscellaneous		15	15	15	
Total reduction		145	193	242	

SUMMARY

Milk production (the supply) has been exceeding the amount consumed (demand) at prevailing prices since late 1952. In order to balance the supply and demand it will be necessary to produce less or consume more, or some of each. The recent reduction in prices should encourage consumption. However, lower milk prices call for an increase in production efficiency, and the individual dairyman must adjust his "culling point" as costs and prices change.



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human nutrition and home economics RESEARCH

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IN THE U. S. DEPARTMENT OF AGRICULTURE

PA No. 251

By way of introduction

To put science to work for better everyday living is the assignment of two small research groups in the United States Department of Agriculture: the Human Nutrition Research Branch and the Home Economics Research Branch. These Branches are part of the Department's Agricultural Research Service. Some call them HN and HE for short.

The task of these two branches, in one sentence, is to develop through research new knowledge about efficient household management, and ways to make best consumer use of food, fiber, and other products of the country's farms.

Three roads to progress are taken in carrying out the assignment:

1. More knowledge is sought about basic needs for food, housing, and other goods and services that figure in everyday living . . . as guidelines for planning by the Nation's families.

2. More knowledge is sought about these goods and services . . . for increasingly effective use of the Nation's resources.

3. Statistical pictures are taken at intervals to show what families buy and use in everyday living . . . to see how the Nation is advancing toward being better fed, housed, clothed.

The research in human nutrition and home economics is done in the interest of consumers, particularly homemakers, as other Government branches aid the farmer, manufacturer, merchant, wage earner. Homemakers in the United States now number more than 33,000,000. They are sometimes called the largest occupational group. The degree of their success in buying, and in managing time, energy, and goods, has an important bearing on the kind of living that the Nation's families enjoy.

The HNHE research staff numbers about 230. Most of these are scientific specialists and their aids, working on the research projects selected for the current program.

Many are home economists, as you might expect, but most of these have an added major or minor in some specialty, such as nutrition, experimental cookery, chemistry, physics, bacteriology, textiles, housing, household equipment, economics, statistics. Specialization is necessary in research.

Besides home economists, the research staff includes men and women who are expertly trained and experienced as chemists, physicists, physiologists, bacteriologists, architects, statisticians.

When new employees are needed, they are obtained from civil-service lists of those who have qualified. The Civil Service Com-

mission, Washington 25, D. C., is always willing to take names and notify applicants when examinations are to be given in their fields. Usually there's an examination for home economists each autumn. College seniors can take this examination, and thus may be on the civil-service list by the time they are graduated in June.

The Branches are located partly in downtown Washington, D. C., and partly in Maryland, 16 miles away.

In Maryland, near Beltsville, are the experimental laboratories for work in food and nutrition, textiles and clothing, housing and household equipment. The laboratories are housed in two colonial-style brick buildings in a research center maintained by the U. S. Department of Agriculture.

In Washington, in the Department's South Building, are the offices of the family economics staff, which gathers information by interviewing families in different parts of the country and does its analytical work at desks, typewriters, and calculating machines. Here also are the offices where food-composition data are compiled and summarized.

Other research organizations take part in some of the research, either on a cooperative or contract basis. Such arrangements to speed progress are made with Federal and State agencies and also with nongovernmental organizations, such as universities, having specialized personnel and facilities.

And now, let's look into some of the laboratories and workrooms.

In this building and another like it are laboratories for work in food and nutrition, textiles and clothing, housing and household equipment.

Food and nutrition research

What's in a food

Turning in at a nutrition chemistry laboratory, you find a research group studying food carbohydrates. Food-composition tables now published give the carbohydrate content of foods in general terms. But newer equipment and techniques open the way to determining systematically the amounts of different types of carbohydrates—the starches, sugars, pentosans, cellulose. As a beginning, these chemists face the question: What kinds and amounts of sugars, singly or combined—sucrose, glucose, xylose, and so on—are present in familiar foods?

Answers will lead to a research question to be taken up by staff nutritionists: To what extent is each kind of carbohydrate utilized by the body? Findings will add to understanding of nutritive values of many foods and will help those who plan diets for the well and the sick.

In another nutrition laboratory, the staff is measuring amounts of some of the newer B vitamins in foods. A while back, they assayed many foods for folic acid to round out research with this vitamin by other scientists. Now they are taking stock of pantothenic acid; and they may go on to work with vitamin B_{12}. As tools to measure a food's content of these vitamins they choose micro-organisms known to require a particular "B." Into culture tubes they put media adequate for the bacteria's nutritional needs except for the one nutrient being tested—and this is provided by extracts from foods. The more the tiny organisms grow and multiply, the greater the amount of the vitamin in the particular food being studied.

Micro-organisms are at work similarly in the protein chemistry laboratories. In fact, one achievement in these laboratories has been developing and applying microbiological procedures to measure more quickly and easily amounts of amino acids that proteins contain. Nine of the nutritionally important amino acids in foods are now being determined in this way.

Experimental diets

In the nutrition physiology laboratories, some rooms are occupied by colonies of rats, helping to answer questions about food requirements for growth and for well-being throughout life, or the relative usefulness of different foods for specific purposes. It is increasingly evident that the body is able to use many nutrients in foods only to a

partial extent. Hence, the task of taking a food apart chemically and reporting on its content of key nutrients is often followed by these biological experiments to show true nutritive value.

One of the newer fields of research is the realm where teamwork among nutrients is being studied. So, some rats are on diets planned to gain new knowledge about the body's use of proteins when eaten together with specific carbohydrates . . . that is, does a particular carbohydrate lessen or increase the body's requirement for a particular amino acid? Other rats are used to study some effects of food combinations at different stages of growing up and growing old.

Food-preservation progress

In the food-preservation laboratories much research has been done to put home canning and freezing on a scientific basis—an important matter to 20,000,000 families in the United States, who put up some of their own food. Many use the direction booklets, resulting from the work, and others get the same directions quoted in magazines, newspapers, and other channels to the public eye.

Now, on the laboratory tables you find bright-colored jellies, and apparatus for measuring the set, or strength, of a jelly, the sugar content, acidity, and other characteristics. Different proportions of fruit and sweetening and types of pectins on the market are being used in the experimental batches, and time-saving shortcuts are sought. When taste-test reports and other records are evaluated, this working team will give homemakers the benefit in an up-to-date revision of its directions for using fruit in sweet spreads.

Scientific home cooking

In food-preparation laboratories, you find professional staff and their helpers weighing, measuring, mixing. They may be experimenting with some food unfamiliar to many homemakers. When young turkeys no bigger than chickens began coming to market, directions for roasting these handy small birds were developed here. When dry milk products became much more plentiful, the staff conducted experiments to provide up-to-date information on reconstituting dry milk and using it in cooking and in mixes, and on ways to use it to put extra milk into meals. At other times the staff may be determining the effect of different household methods of cooking on flavor, tenderness, or yield of a food. To rate foods on eating quality, trained judges from the research staff take time out from other duties to be on judging panels. Objective tests are made also on such points as color or tenderness of a food.

Quality questions

Much of the research on food for the table is done cooperatively with the Department of Agriculture's plant and animal research scientists and market specialists. Ups and downs of quality often appear to be linked with differences in feed management of livestock, ways of using insecticides in food production, or temperature of a food during shipment or storage. So, at times, the food-preparation staff undertakes to evaluate the cooking and eating quality of sample lots of food from an experimental farm or other known source.

Food for many

One kitchen has institution-type cookers, a chef's table, and other equipment for experimental cooking on a large-quantity scale. Here, many recipes for use in school lunch programs have been developed. More recently, the research has been aimed at using plentiful foods in new dishes that will appeal to adult tastes—to expand use of these foods in restaurants, hospitals, and other institutions where large numbers are served. Before such recipes are released for general use, not only laboratory judges but restaurants, as well, have tried out a particular dish to test its acceptability.

Learning a shortcut microchemical technique, these nutrition scientists will be able to analyze a few drops of blood from a fingertip and report the blood owner's rating on four nutrients.

1. The rat with its head in a hood is having its blood pressure measured . . . in studies to learn relationships between diet and premature aging.

2. By laboratory-precise cookery, this worker is helping to classify potatoes as to suitability for various cooking methods . . . part of the Department's research to improve marketing and food use.

3. Three stages in a food chemistry experiment on raw and cooked boneless beef. Here, beef is being trimmed, ground, and analyzed for nutritive values.

Food-composition clearinghouse

One working team in the Human Nutrition Research Branch has its headquarters, not at the laboratories in Beltsville, but in the Department's offices in Washington, D. C. This group, which compiles scientific findings on food composition, is a constant user of scientific library references.

Providing up-to-date tables on average amounts of calories, protein, carbohydrates, and key vitamins and minerals that foods provide is the task of this team of nutritionists and food chemists. Their work is essential to staff members who conduct family food surveys and calculate nutritive value of food supplies, and to those preparing food-management guides. They serve the public by issuing food-composition tables needed by dieticians, doctors, and others who plan diets. Writers of many textbooks and diet manuals quote the food-composition figures, widening their use further.

The staff bases its tables on worldwide laboratory findings measuring amounts of nutrients contained in man's food. All they can learn about the nutrients in each kind of food is systematically recorded and evaluated to arrive at the best figure for each nutrient. As scientific knowledge advances, the tables become increasingly accurate and complete. Eleven nutrients are now included in the published tables, and the staff looks forward to adding more.

Beyond Beltsville

The foregoing glimpses have offered a sample of work in the Human Nutrition Research Branch's own laboratories and workshops. To round out the picture, here are a few examples of work being done cooperatively or by contract to speed the research program.

In Texas, fatty acids—among the obscure, yet important, nutrients—are being studied to find out the amounts and kinds that children need for normal growth and development.

In Illinois, Iowa, and Wisconsin, experimental work is being done to learn the thiamine and riboflavin requirements of normal individuals in different age groups.

Research organizations in many States are cooperating with the HNHE research staff to gain scientific facts about food habits and the nutritional condition of selected population groups, such as teen-agers, young children, older men and women.

In Indiana, Louisiana, and Washington, shell eggs have been used in cooking and baking and the products judged for eating quality, to learn more about market grades, storage conditions, and other factors in relation to quality.

Textile and clothing research

Fabrics to fit needs

In the physical properties laboratories of the Home Economics Research Branch facts about fabrics are sought for two-way advantage: to help homemakers select fabrics to suit different purposes; to give the textile industry guidance in meeting consumer needs.

For some of this work the weather must be controlled. So, double-protecting doors lead into an air-conditioned room where machines measure fabrics' breaking strength, stretch, resistance to rubbing, air permeability, and other traits. You might find the machines at work with samples of cotton knit goods or housedress materials woven to specification using yarns of different size and number per inch. The textile researches are focused chiefly on cotton and wool—American-grown fibers important to our farm economy.

Facts from wear

Actual wear experiences sometimes add to what machines and other laboratory techniques can tell about fabrics' usefulness. Thus, for months, the customer line in the research-center cafeteria has walked over a rug of many colors, which is really sample strips of rugs representing different fibers and kinds of construction. The cash register provides a record of the number of walkers. The procedure calls for daily vacuum cleaning of each sample strip and cleaning at intervals with soap and water. Photographs of the rugs provide a visual record of changes. From time to time a sample is withdrawn from use for machines to report on its physical properties compared with when it was new.

Fabric care

In one textile chemistry laboratory, home laundering problems are getting attention, including efficiency of different detergents in removing soil and their effect on the varied fabrics now on the market.

Another chemist is finding out what differences in stain-removal procedures may be required for fabrics with special finishes and those made of the newer fibers. Methodically, she applies fruit juice, grease, and other typical household stains to squares of test fabric and removes the stains, learning not only what chemicals are effective but also whether the goods is affected and whether old as well as fresh stains respond.

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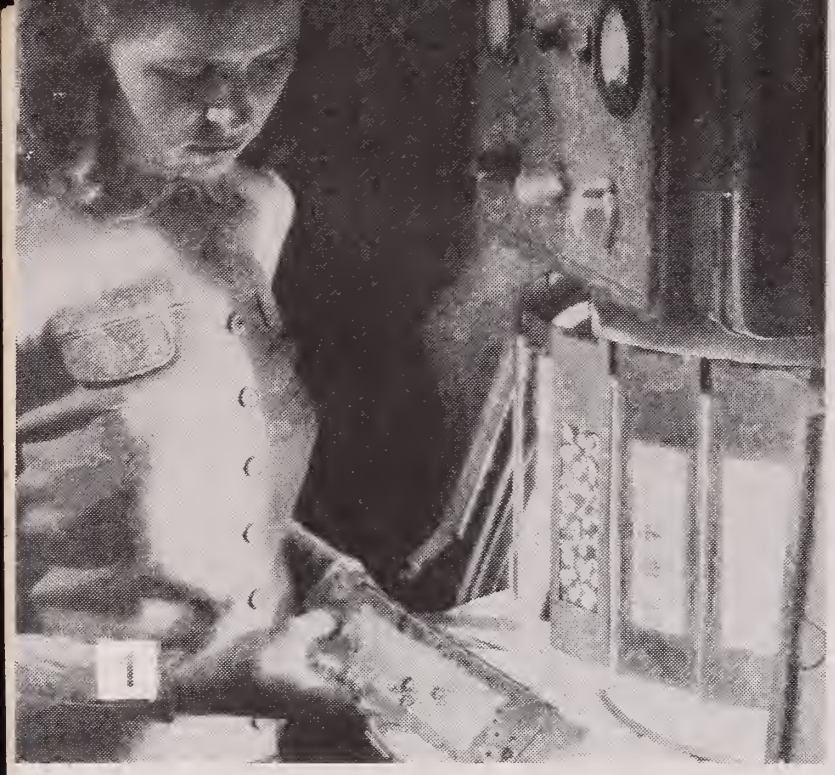

1. A staff worker loads a frame to be exposed to the laboratory sun, to measure the colorfastness of fabric samples to light . . . one of the physical properties important to many fabric uses.

2. A textile specialist shows an abrasion machine test on wool samples to a college student—one of a group who have been wearing trousers made of these fabrics for parallel records of actual wear.

3. For a television audience, two clothing specialists demonstrate a step in making a dress—part of a lesson series in which the Department of Agriculture sought to measure effectiveness of TV teaching.

Putting findings to use

One specialist may be surrounded by notes and records about men's shirts. She is working on one of the buying guides put out by the Branch to help consumers judge quality of materials and workmanship when selecting clothing items. To prepare for this writing, she has visited shops, casting an experienced eye over construction details of shirts at varying prices. She has gone to factories to learn more about production methods that affect values important to the consumer. She has brought sample shirts to the laboratory to examine construction points that customers can't see or may not notice but that have a bearing on serviceability, comfort, and appearance.

Findings from textiles and clothing research also are used by manufacturers as source information for the education of buyers and salespeople and for factual labeling. The scientifically determined facts are also used in developing specifications . . . for example, for cotton broadcloth for men's shirts, or chambray for women's housedresses, or for construction of the housedress itself.

Housing and household equipment research

Experimenting with space

Entering the housing laboratories of the Home Economics Research Branch, you come upon several housing specialists experimenting with space, to enable home planners to make homes more convenient to work in, more comfortable to live in.

One specialist is determining the space needed for preserving food in the home. She has canned various quantities of food in a laboratory kitchen. Utensils and jars were fitted with cellulose sponge rings dipped in dye, to leave a print where each one occupied space on a paper-covered work counter. Analyzing the space patterns, she can arrive at recommendations for counter space that should be provided in homes where food preservation is an important activity. Followup tasks are to determine adequate storage space in the average farm home for canned foods, and to design convenient storage facilities.

As guidance on the extent of canning now done, she refers to data in statistical reports that show kinds and quantities of food put up by farm families in different parts of the country. Such source statistics are available since the housing staff and 34 State experiment stations joined in making the first 4-region survey to learn what housing features farm families want, the extent of their household activities, and their belongings that must be stored.

House plans in the making

Farm houses, more than city houses, are headquarters for many work activities and take special planning if they are to combine efficiency and comfort. Yet few architects specialize in such plans. To provide farmhouse plans suited to different family requirements and sections of the country, the Department of Agriculture and the States together maintain a regional plan service, and the home economists share in this.

1. In this kitchen, experiments were recently made to compare amounts of electricity and bottled gas used in cooking family meals.

2. Determining space required to store a given amount of bedding and linens, these workers measure clearance for hand action.

Recently, the HE housing specialists have been cooperating to develop expansible house plans, which meet needs of young couples who must start a home thriftily. The staff is giving attention to features in plans which provide for dual use of space and convenience at the first building stage, when the family occupies the basic unit—usually a large living room, kitchen, and bath—awaiting the time when bedrooms can be built.

On the research-center farm, milkers occupy four expansible houses experimentally built near the dairy barns. As the families use these houses, the housing specialists are keeping in touch with them, to observe serviceability of types of floor coverings and kitchen counter surfaces, and also to learn how well storage units and other interior arrangements of the plans meet family needs.

Refrigeration, farm-size

To develop plans for large refrigerators suited to farm use is a recent Department research project in which the household equipment staff shares. After a survey of walk-in refrigerators on 160 farms, HE physicists and agricultural engineers in the Department built their first experimental walk-in, designing it to overcome faults in designs observed and to add improvements. This farm refrigerator has a large chillroom with removable shelves and a freezer room capable of freezing 100 pounds of food in a day. Two nearby farmers built walk-ins from the plan, so that records could be obtained on the operation under normal use conditions. The designers then pronounced the working drawings ready to go to the country's farmers through the regional plan service.

Now, the laboratory model has been redesigned to provide an alternate arrangement: a bigger freezing room and smaller chillroom. Moved to a Maryland farm, this model is undergoing its service testing, to make sure that its design, too, will merit approval.

Equipment performance

From HE research on the operating characteristics of home equipment come recommendations on selection, care, and use. Modern dryers now line the walls of one laboratory where equipment specialists are developing test procedures for predicting performance of dryers of different types when in home use. In one series of experiments, the dryers work with varied fabrics from terry toweling to nylon crepe to show how different drying methods affect each fabric.

Family economics research

The family economics staff in the Home Economics Research Branch is mainly concerned with reporting the kind of living rural families get and how well fed the Nation's families are and with making recommendations for better diets.

Families' food

Some of the food economists have lately been out in midwest and north-central States interviewing some 2,000 rural homemakers, to learn about present family food practices on farms and in villages. From this work came masses of facts and figures to be analyzed. The reports, with statistical tables, will show how the food dollar is spent and how much of each kind of food rural families in this region raise at home and buy in market, how much food they can and freeze.

Reports of this kind show further strong and weak points nutritionally. Population groups most in need of nutritional improvement are located and weak points in diets singled out. From recent surveys among both city and rural people the researchers have learned that calcium is the nutrient most likely to be short in family food.

Since milk is the main calcium source in the food supply, such studies indicate need for greater use of milk in such population groups as homemakers, especially older women, and teen-agers, especially girls. A recent cooperative project with southern States showed that many farm families do not keep cows and get too little milk in their diets.

Guides to good nutrition

As one means of helping families to improve diets and to get good returns for their food money, food economists develop lists of food quantities that provide for nutritional needs at different cost levels. They take into account survey findings showing what people eat, figures on food costs, and data on the nutrients foods contain and the amounts of nutrients that meet human needs. From time to time, they revise these family guides to good nutrition to keep in line with advances in nutrition knowledge and changes in prices and food habits.

The guides on food management have been much used by families and by teachers and extension and social workers. Recently, the staff has adapted this type of material to fit food-management problems in institutions where the "family" to be fed may number hundreds. Research is under way to learn more about institutional diets and how well they meet needs of the people being served.

Consumer-education aid

Assembling dependable information on some particular food for consumer education has long been a problem for extension leaders, teachers, market specialists, and writers. HE food economists have begun to compile source material and issue a booklet series. Tomatoes, peaches, beef, pork, milk have thus far been dealt with, providing facts on nutritive value, food value for money spent in comparison with other foods, seasonality of supplies, selection and use of different varieties, grades, and forms, and use in family meals.

Farm and city wardrobes

Much more is known about the food families eat than about the clothing they keep on hand, buy, and make at home. As a start toward obtaining information on such points, the family economics staff interviewed families in a northern and a southern city and in two rural counties near the northern city. The reports being completed give much statistical detail on kinds and quantities of clothing owned at different income levels and by persons of different age groups. The survey shows, for example, that, taking wardrobes as a whole, husbands and wives on farms have about one-fourth less clothing than those in the city. It shows that while home sewing is more prevalent among farm than city families, it is an important source only for a few types of clothing worn by farm women and girls. The data are useful, not only to fiber producers and the textile and clothing industry, but also to teachers planning courses for college, high school, and homemaker groups and to welfare workers who plan for family assistance.

Rural family living

To find out how farm families are faring in providing for wants and needs is another assignment of this group. Staff members are now comparing levels of living in four counties of Kansas following World War II and in 1935–36, to see how changes in spending are related to changing income, prices, and developments in the surrounding community.

A standing date each autumn calls the family economists to take part in the family-living programs included in the Department's Agricultural Outlook Conference. The conference brings to Washington extension specialists from all parts of the country. Picture-and-graph charts are relied on to present many of the economic trends in rural living, from home improvement to medical care.

Getting out the facts

Findings take many forms

Getting findings ready for public appearance is the last step in the research on ways to improve homemaking and ways to use products from the land more effectively. This is where the Department's specialists in information techniques join with the research scientists. Publications take on such varied forms as printed bulletins, educational charts, press releases, radio scripts, filmstrips, occasional motion pictures and television programs.

The staff approaches each research report with the question: Who will use these facts? Are they for research scientists? Or will they be most useful to teachers, extension leaders, and other professional home economics groups? Or are there practical points to give directly to homemakers from coast to coast? Sometimes the same research project provides highly technical data for one audience, and homely how-to-do-it directions for another.

Suppose the food laboratories have new research results on home freezing to present. A group of writers, editors, artists, and layout specialists pool their know-how to help the scientists put the new facts into clear directions for homemakers, and line up step-by-step picture sequences to demonstrate how to proceed. With format, paper, and type decided, a bulletin is shaped up for the printer.

Plans for press pictures might be going forward, too, featuring a capable, attractive woman using the new technique against a home-kitchen background. A visual specialist might be figuring how to make these same pictures into a filmstrip for teachers to use, and thinking ahead of how to use them on television. Before publication time, a writer would turn out a press story to go to editors of magazines, women's pages in newspapers, and women's program directors on radio and TV. Meanwhile, the editors would be reviewing a manuscript of the research report to get it into form for publication as a technical bulletin or as a contribution to a scientific journal.

How many bulletins?

Records for the past 30 years show that more than 146,000,000 copies of printed bulletins from the human nutrition and home economics research have been distributed. The bulletin on home canning of fruits and vegetables, through many editions, has totaled 12,000,000 copies; the stain-removal bulletin nearly 4,000,000. In current circulation are about 160 technical and popular publications printed by the Government press. In addition, many research reports are printed in scientific journals.

History highlights

How the HNHE research evolved

In 1894 began the United States Government's research in human nutrition. That year, the Congress appropriated $10,000 "to enable the Secretary of Agriculture to investigate and report upon the nutritive value of the various articles and commodities used for human food, with special suggestions of full, wholesome, and edible rations, less wasteful and more economical than those in common use." Planning a program was entrusted to Dr. W. O. Atwater, director of the Department's experiment station work. His own research was in nutrition, and so comprehensive and clear were the goals which he set for the Government's nutrition investigations that the Department still steers by them.

In 1915, from this nucleus of nutrition research, an Office of Home Economics was organized. This was done in response to demand of extension workers for more scientific facts in nutrition and other phases of home economics. The Smith-Lever Act of 1914 had opened the way for a nationwide program of home demonstration work, but at every turn the leaders were confronted by questions they could not answer.

A Bureau established

During World War I, pressure increased for more help on home problems and the Nation became aware of the practical value of scientific knowledge on food and nutrition in a world crisis. On July 1, 1923, the home economics unit in the Department of Agriculture was given the responsibilities and dignity of Bureau status. The new Bureau of Home Economics ranked in administrative level with other bureaus doing research in animal and plant production, and was responsible directly to the Secretary of Agriculture.

Changes in name and leadership

In 1943, during another world conflict in which nutrition and economical use of food, clothing, and other supplies became a paramount issue, a change was made in the Bureau's organization and name. Protein chemistry research directly related to nutrition in another branch of the Department, was merged with the nutrition work in the home economics laboratories, and Bureau of Human Nutrition and Home Economics was the name given for the whole.

These changes followed soon after establishment of the Agricultural Research Administration, which brought together within the Department a number of agencies whose chief assignment was advancing scientific knowledge on production and use of food, fiber, and other products of the land. The Bureau of Human Nutrition and Home Economics became an integral part of that group.

Reorganization of the Department begun late in 1953 brought new designations. The Agricultural Research Administration became the Agricultural Research Service. And the work formerly done in the BHNHE was assigned to two branches: the Human Nutrition Research Branch and the Home Economics Research Branch, each under leadership of a Chief. The former Chief of the BHNHE became Director of Human Nutrition and Home Economics Research.

Some work accomplished

What kind of progress has been made in human nutrition and home economics research in the U. S. Department of Agriculture over the past quarter century? The record shows much pioneering, many far-reaching tasks completed, or advanced. Among highlights that rate mention are the following examples of accomplishments by this small group of research workers.

1927—Pioneered in working out procedures to evaluate performance of home refrigerators—incorporated in the American standard test procedure now used by manufacturers and testing laboratories.

1928—Began studies of fabric serviceability, with laboratory measurement of physical properties and actual-use trials to provide technical information needed by shoppers and producers.

1928–31—Pioneered in developing self-help and other functional principles in designs for children's clothing.

1931—Gave homemakers time-and-temperature directions for cooking meats of different cut and quality, based on extensive chemical and physical experiments.

1933—Produced family food plans at four spending levels, as a flexible guide to good nutrition, whatever the family income and the ages and activities of the members.

1933—Began to take part in the Department of Agriculture's annual Outlook Conference—briefing home-management specialists on economic progress and problems of rural families.

1934—Shared in the Department's first survey showing conditions of farmhouses.

1935–37—Joined with other agencies to gain the first comprehensive picture of American family spending and saving—the Consumer Purchases Study.

1937–40—Took scientific measurements of 147,000 children and about 15,000 women for improved systems of sizing clothes.

1939—Determined vitamin A requirements of adults by finding quantities required to restore and maintain normal night vision following impairment by a vitamin A-deficient experimental diet.

1939—Determined thiamine content of about 100 foods—the first systematic analysis using a pure crystalline vitamin as a standard.

1940—Developed designs for women's work clothes, setting high standards for comfort, efficiency, and safety. These functional garments for farm, factory, and homework stimulated industry to launch a new branch of women's wear.

1940—Began laboratory work on deterioration of household textiles due to micro-organisms. One result: 3 public service patents.

1941—Published the first simple daily nutrition guide to win nationwide acceptance.

1942–45—Provided wartime guidance to homemakers in conserving food, clothing, and equipment.

1942—Cooperated in a nationwide survey of family spending and saving in wartime.

1942—Began an annual estimation of nutritive value of the national per capita food supply.

1944–52—Developed microbiological methods for economical and rapid assay of the 10 so-called essential amino acids.

1946—Reported research revealing wide differences in the extent to which the body can use the carotenes of yellow and green vegetables for vitamin A needs.

1946—Completed 3-year intensive research which put home canning on its own scientific basis, replacing earlier adaptations of industrial research data for the purpose.

1947–49—Cooperated in four regional surveys to determine housing features that farm families want and to provide facts on household activities, essential to establishing space needs for work and storage.

1948—Completed a systematic laboratory study, determining effects of household cooking methods on vitamin and mineral content of 20 commonly used foods.

1948—Designed a step-saving kitchen, which aroused wide national and international interest among homemakers, equipment manufacturers, and architects.

1948—Launched clothing- and food-consumption studies as part of the Department's new research and marketing program.

1950—Issued "Family Fare" bringing under one cover information on nutrition and food management, including modern principles of cookery and recipes.

1951—Prepared the first comprehensive report showing amounts of folic acid—one of the newer B vitamins—in several hundred familiar foods.

1952—Took leadership in a National Food and Nutrition Institute for 400 persons from public and private agencies to appraise progress in nutrition and plan for improved programs.

1953—Made a statistical study of diets of 1,000 homemakers, which shed new light on food habits and nutritional implications for this population group.

1953—Advanced understanding of human needs for unsaturated fatty acids, through experimental work by contract at the University of Texas Medical Branch.

1953—Used geometric principles to arrive at a formula for predicting and controlling shrinkage in knit fabrics.

1953—Made a systematic study to compare energy utilization by household equipment of two commonly used heat sources—electricity and liquefied petroleum gas.

Administrative responsibility

Persons filling the key positions in HNHE research at present are:

Director, Dr. Hazel K. Stiebeling

Human Nutrition Research Branch:
Chief, Dr. Callie M. Coons
Assistant Chief, Dr. Esther L. Batchelder

Home Economics Research Branch:
Chief, Dr. Ruth O'Brien
Assistant Chief, Dr. Gertrude S. Weiss

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